Project: Phytsosensors for Crop Security

Recipient: University of Tennessee Agriculture Institute

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Subcommittee: Agriculture

Amount requested: $1,000,000

Project description: In an agricultural terrorism scenario when large-scale plant disease agents could be released intentionally, an early warning system would be invaluable for protecting food supply. The University of Tennessee will combine synthetic gene promoters, new fluorescent- and chromo-protein marker genes, and novel gene expression systems to produce crop plants that could be planted on a grid to monitor plant disease in real time. The plants would either change colors or emit a unique spectral signature in early stages of infection. The photonic devices for measuring these spectral responses will be refined as well. In addition to plant diseases, precision agriculture phytosensors for the monitoring of field fertility and water stress will also be developed which will aid in environmental stewardship of natural resources and aid growers in economic farm management.

There are immediate needs for new technology and innovations for monitoring crop diseases-- not only for agricultural terrorism—but also for the detection of new and emerging diseases such as Asian soybean rust, which threatens the soybean belt, especially in the South. UT is among the world's leaders in "phytosensor" technology: using biotechnology to produce plants that could be used to monitor the environment on a large scale. The project will combine state-of-the art technologies in biotechnology and photonics to produce crop plants that can be used directly as early-warning sentinelsfor the detection of plant diseases.